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PLL2248xx is the new Khatod's family of Multi-Lens Modules for outdoor applications, especially for lighting applications in high bay and streets.

PLL2248xx Lenses come in many models. Rectangular shaped – 135mm x 100mm – and consist of an array made of 24 lenses. They perform a variety of Circular Beam Angle Types, from 30° to 90°, one Elliptical Beam and an outstanding Asymmetrical Beam (IESNA Type II Medium Cutoff).

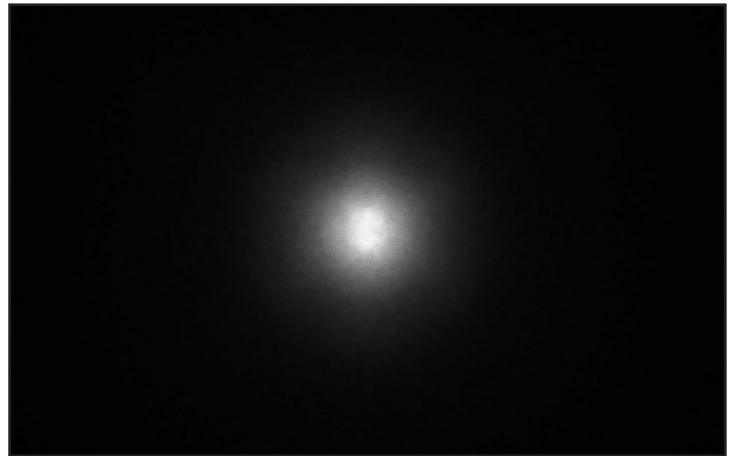
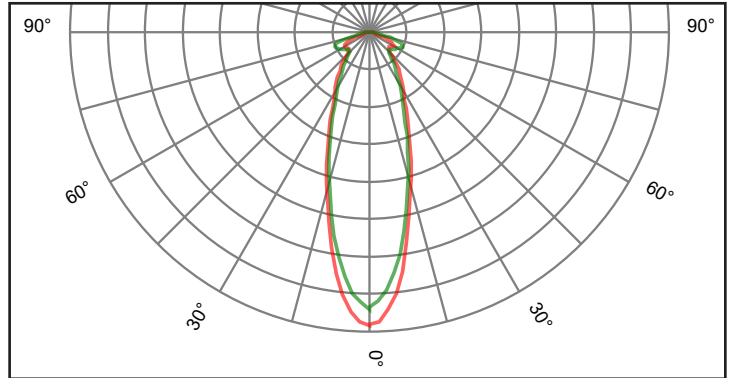
Made of PC, the lenses work perfectly within -40° to +120°C temperature range.

PLL2248xx Lenses are optimized for the most popular 5050 package LEDs without dome. High lighting efficiency and excellent luminous flux. Provided with a silicone gasket ensuring IP protection.

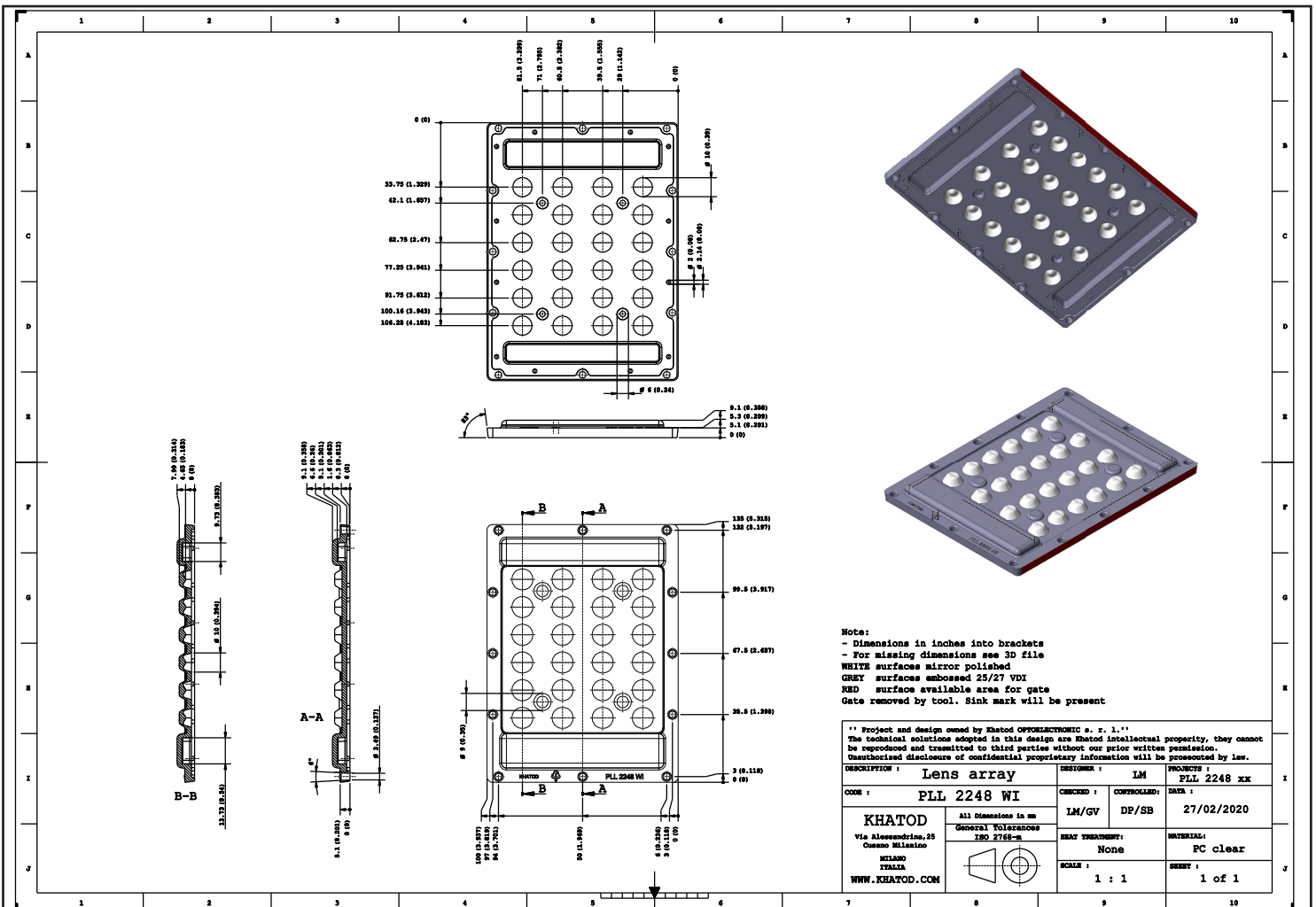
Can be used individually or configured in multiple parts so to create the perfect lighting fixture for your application, as linear lighting rows or in configurations of different shape and width.

The Lenses are easily assembled by screw fixing.

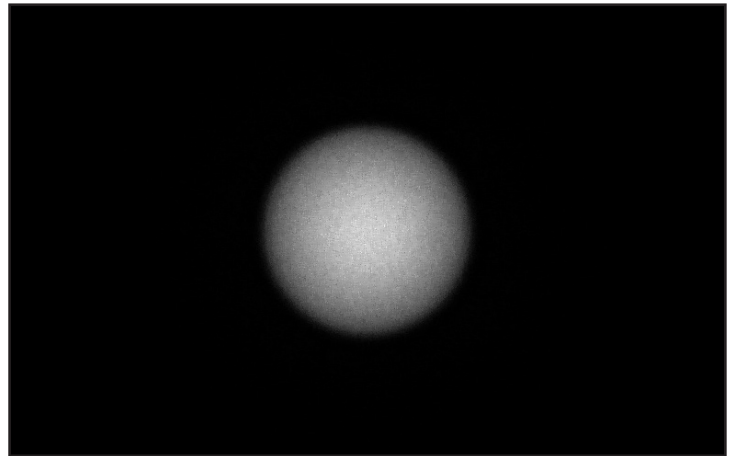
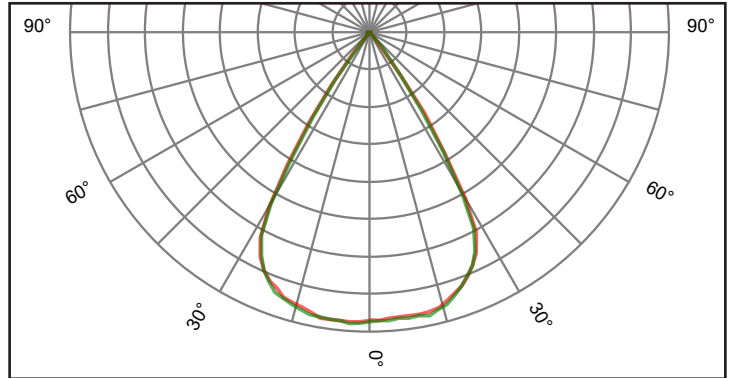
PLL2248WI - Wide Beam



- Material = PC
- Full angle at 50% from maximum: ~ 33°
- Full angle at 10% from maximum: ~ 125°
- The light spots here represented refer to tests carried out with 24 LEDs 5.0x5.0mm , and ~ 14760 Lumen



PLL2248EW - Extra Wide Beam

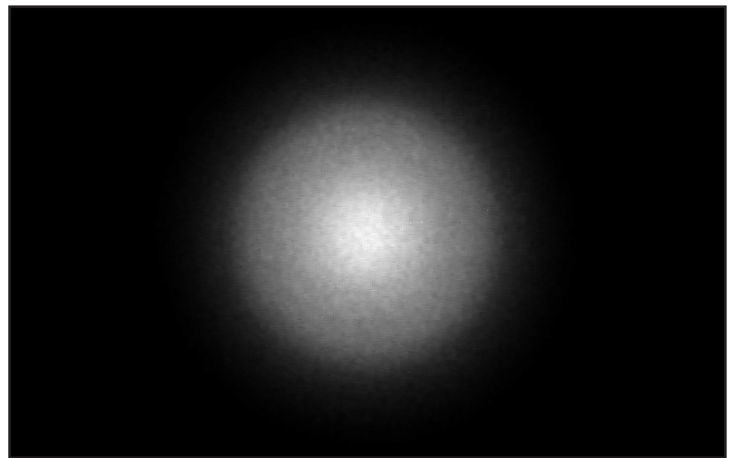
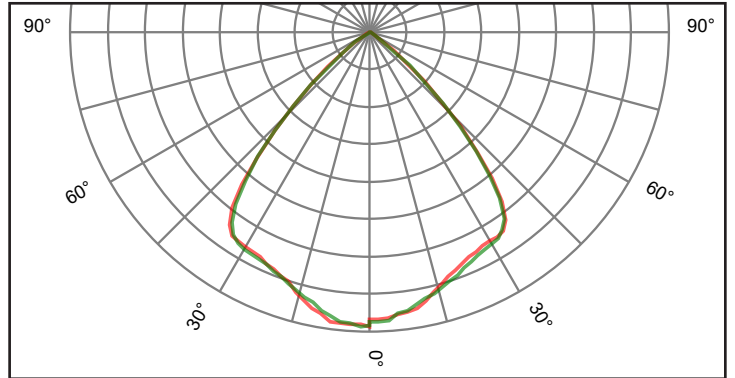


- Material = PC
- Full angle at 50% from maximum: ~ 64°
- Full angle at 10% from maximum: ~ 75°
- The light spots here represented refer to tests carried out with 24 LEDs 5.0x5.0mm , and ~ 14760 Lumen

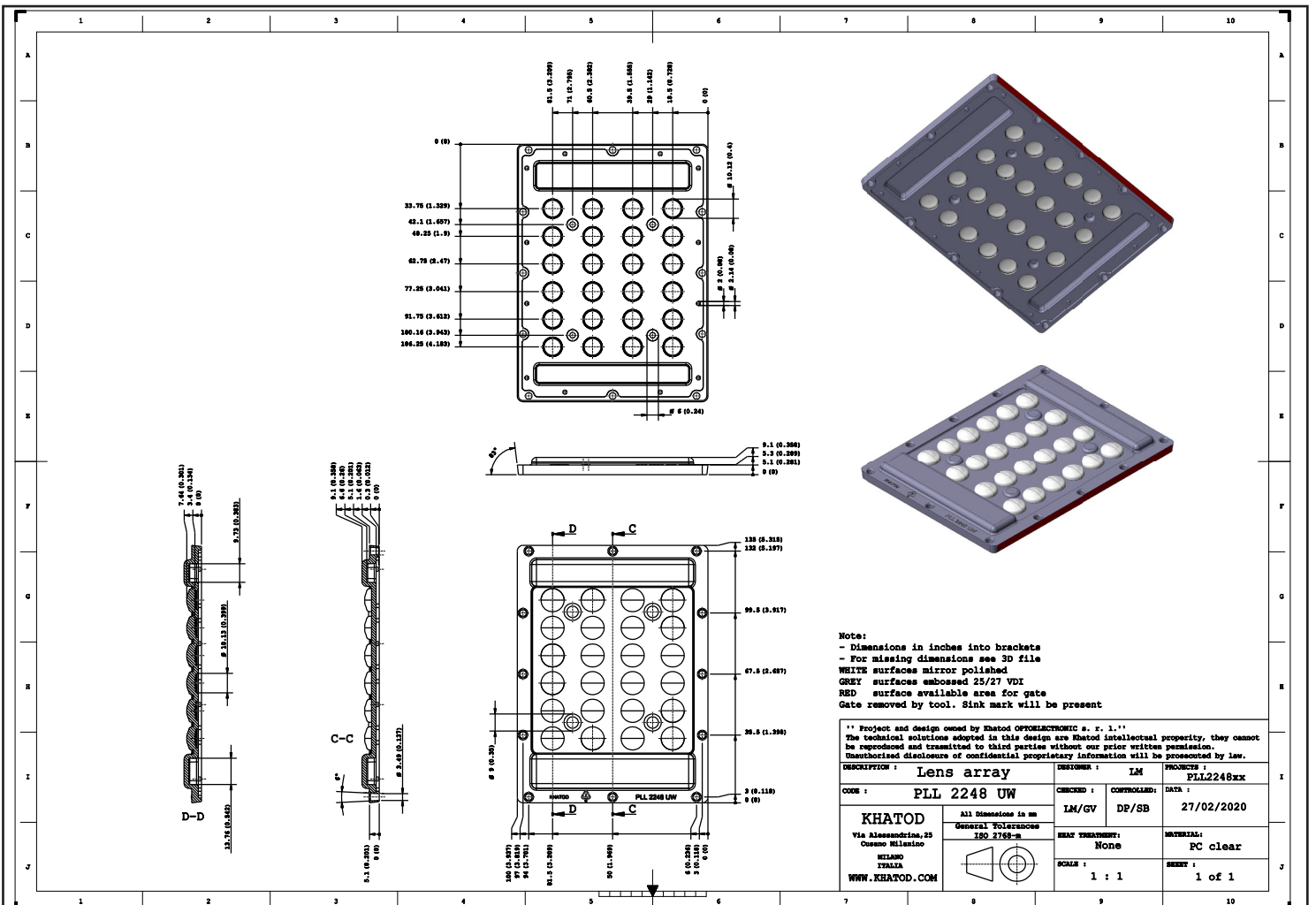
Note:
 - Dimensions in inches into brackets
 - For missing dimensions see 3D file
 WHITE surfaces mirror polished
 GREY surface embossed 55/27 VDI
 RED surface available area for gate
 Gate removed by tool. Sink mark will be present

DESCRIPTION : Lens array		DESIGNER : LM	PROJECT : PLL2248XX
CODE : PLL 2248 EW	CHECKED : LM/GV	CONTROLLED : DP/SB	DATA : 28/02/2020
KHATOD Via Alessandro, 23 Cusano Milanese MILANO ITALIA WWW.KHATOD.COM	All Dimensions in mm ISO 2768-m		HEAT TREATMENT : None MATERIAL : PC clear
SCALE : 1 : 1		SHEET : 1 of 1	

PLL2248UW - Ultra Wide Beam



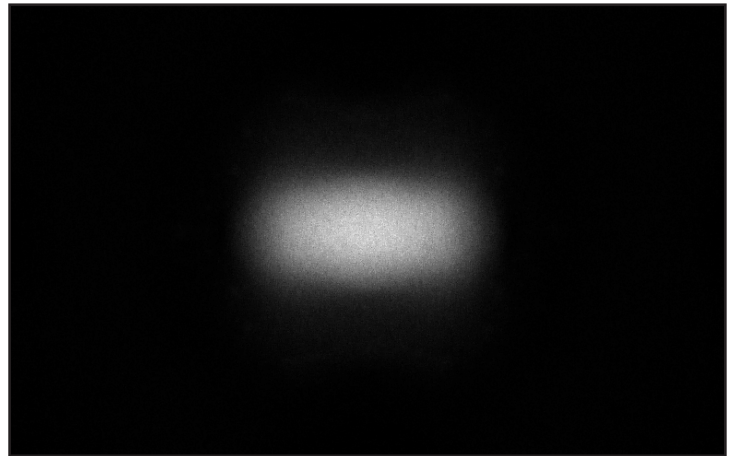
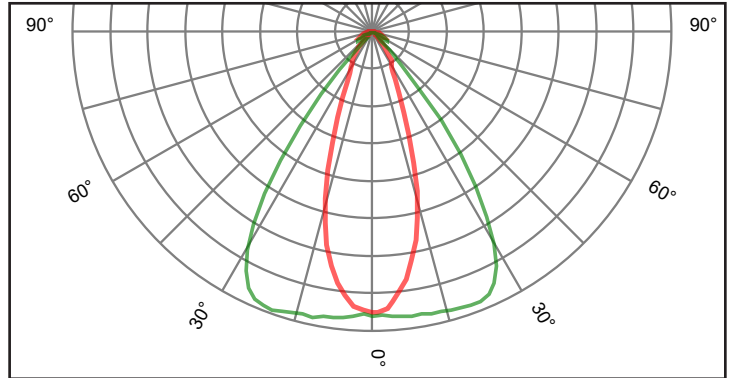
- Material = PC
- Full angle at 50% from maximum: ~ 85°
- Full angle at 10% from maximum: ~ 105°
- The light spots here represented refer to tests carried out with 24 LEDs 5.0x5.0mm , and ~ 14760 Lumen



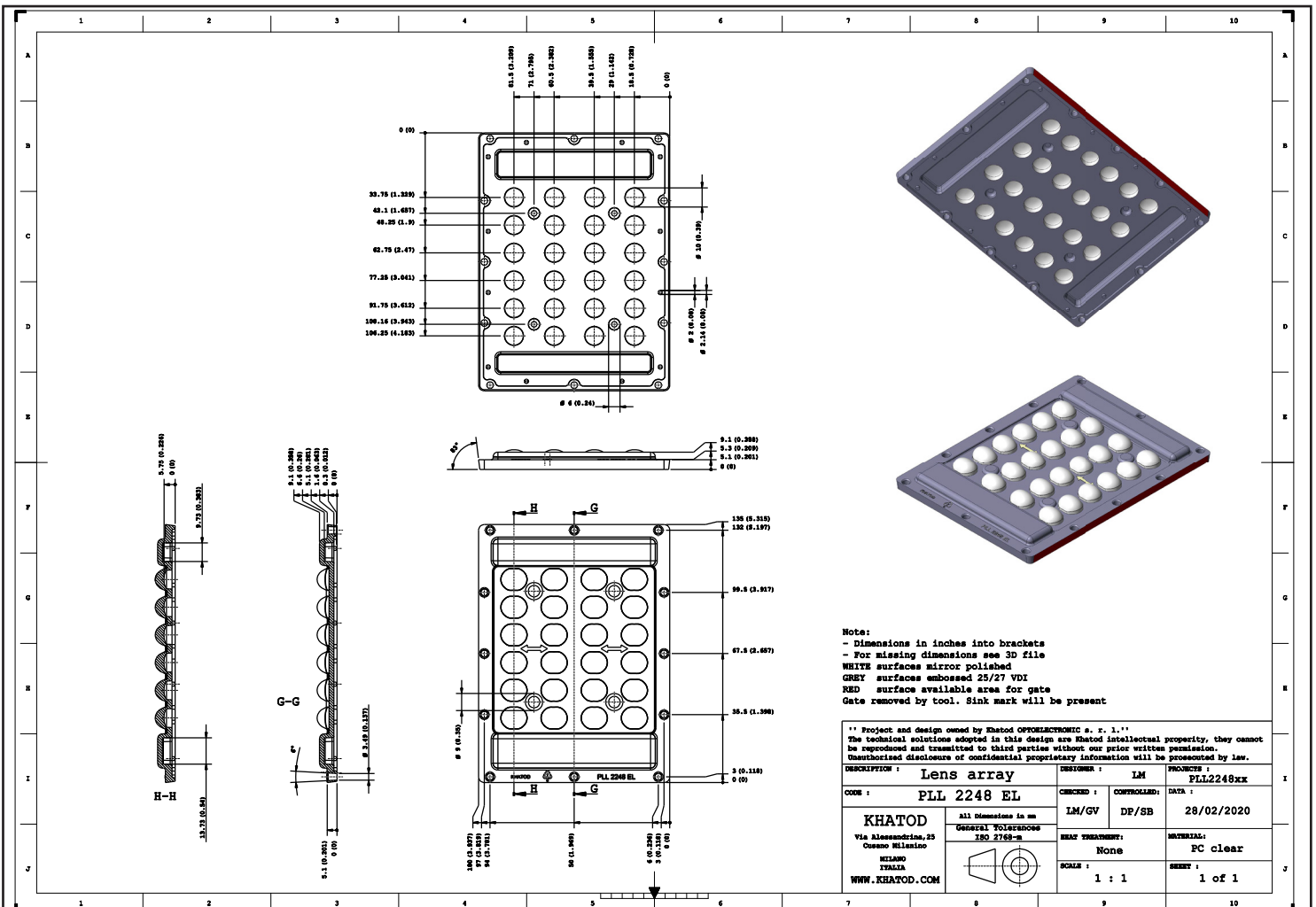
Note:
- Dimensions in inches into brackets
- For missing dimensions see 3D file
WHITE surfaces mirror polished
GREY surfaces embossed 25/27 VDI
RED surfaces available area for gate
Gate removed by tool. Sink mark will be present

Project and Design owned by Khatod OPTOELECTRONIC s. r. l. The technical solutions adopted in this design are Khatod intellectual property, they cannot be reproduced and transmitted to third parties without our prior written permission. Unauthorized disclosure of confidential proprietary information will be prosecuted by law.			
DESCRIPTION :	Lens array	DRAWER :	LM
CODE :	PLL 2248 UW	PROJECT :	PLL2248KX
Khatod Via Alessandro, 23 Cusano Milanese Milano ITALIA WWW.KHATOD.COM	All Dimensions in mm GENERAL TOLERANCES ISO 2768-m	CHECKED :	IM/GV
		CONTROLLED :	DP/SB
DATE :		27/02/2020	
HEAD TREATMENT :		None	MATERIAL :
SCALE :		1 : 1	PC clear
			SHEET :
			1 of 1

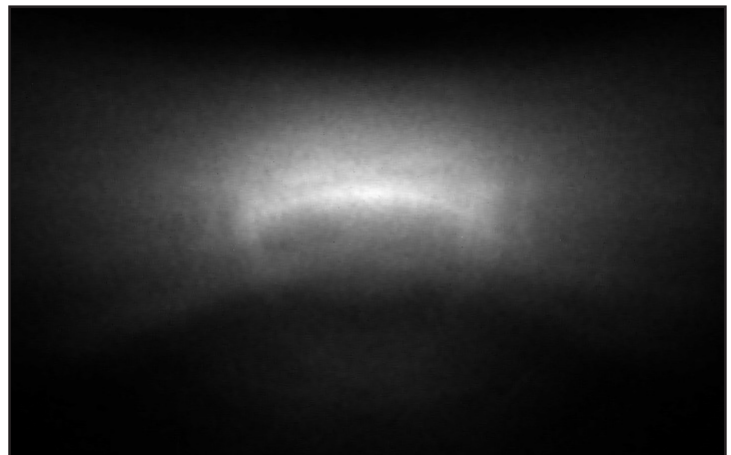
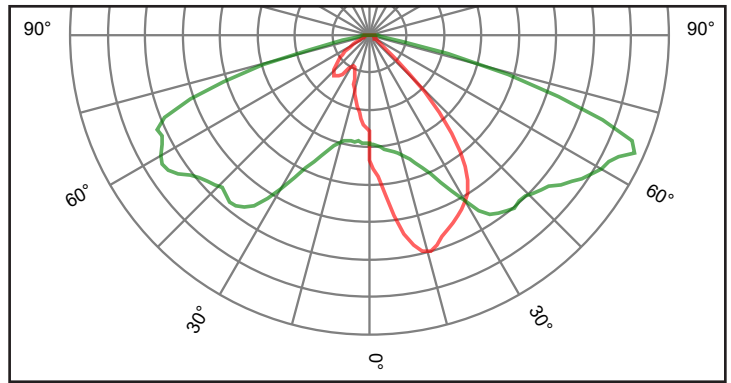
PLL2248EL - Elliptical Beam



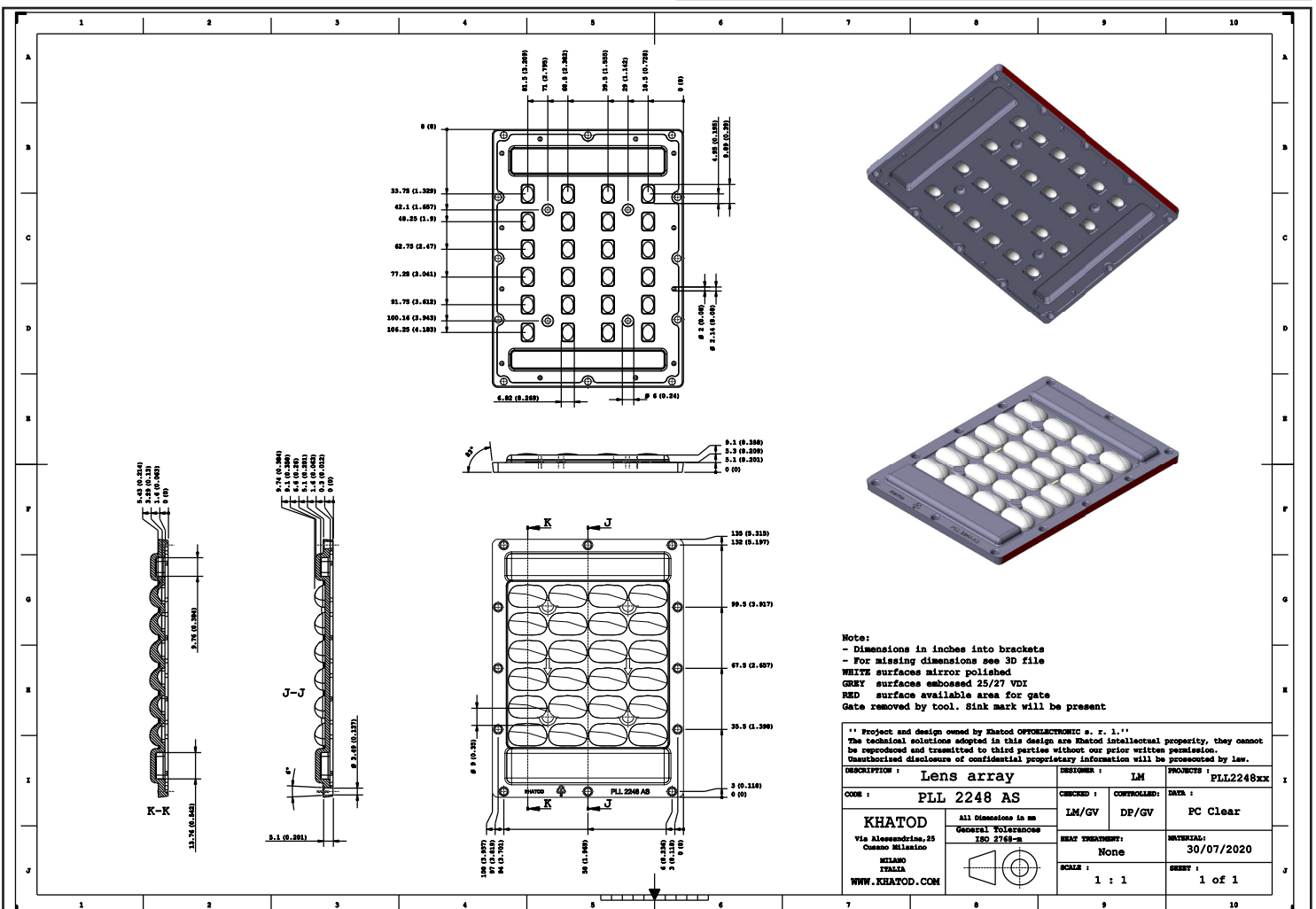
- Material = PC
- Full angle at 50% from maximum: $\sim 35^\circ \times 75^\circ$
- Full angle at 10% from maximum: $\sim 75^\circ \times 88^\circ$
- The light spots here represented refer to tests carried out with 24 LEDs 5.0x5.0mm , and ~ 14760 Lumen



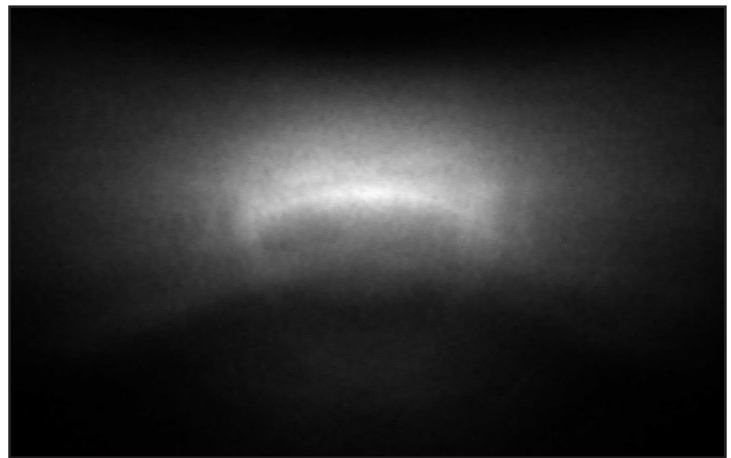
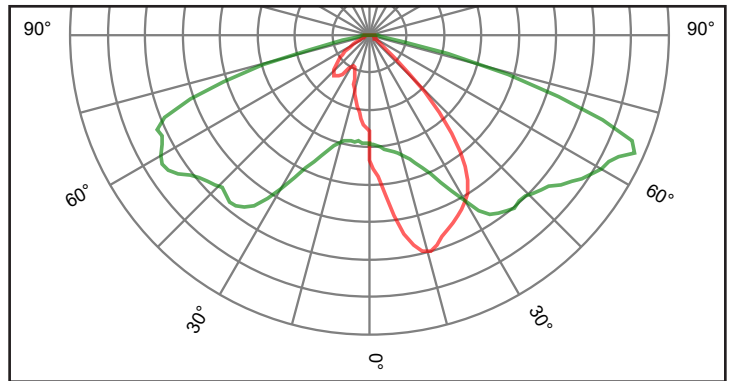
PLL2248AS - Asymmetric Beam - Type II Medium Cut Off



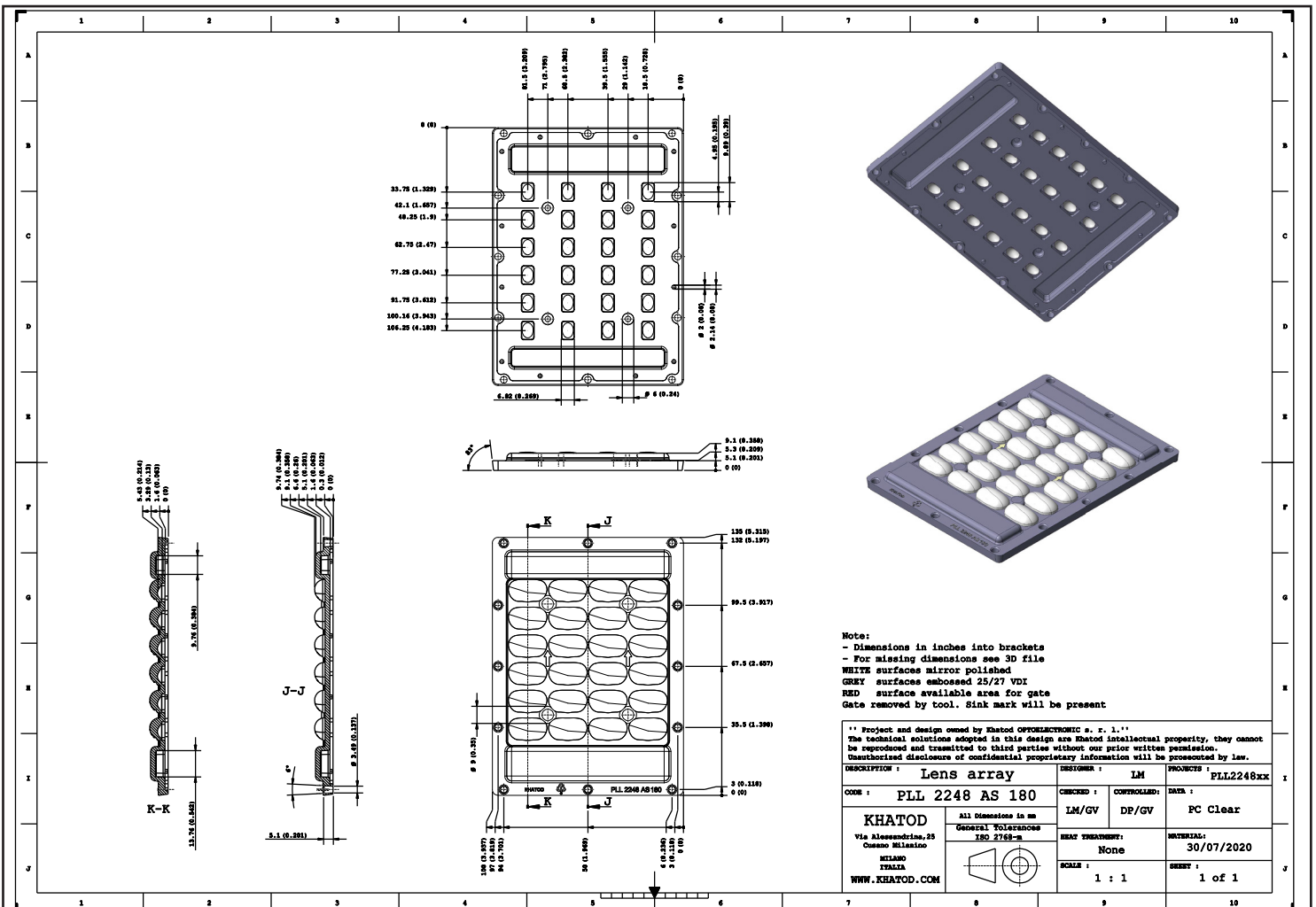
- Material = PC
- Full angle at 50% from maximum: $\sim 90^\circ \times 145^\circ$
- Full angle at 10% from maximum: $\sim 115^\circ \times 160^\circ$
- The light spots here represented refer to tests carried out with 24 LEDs 5.0x5.0mm, and ~ 14760 Lumen



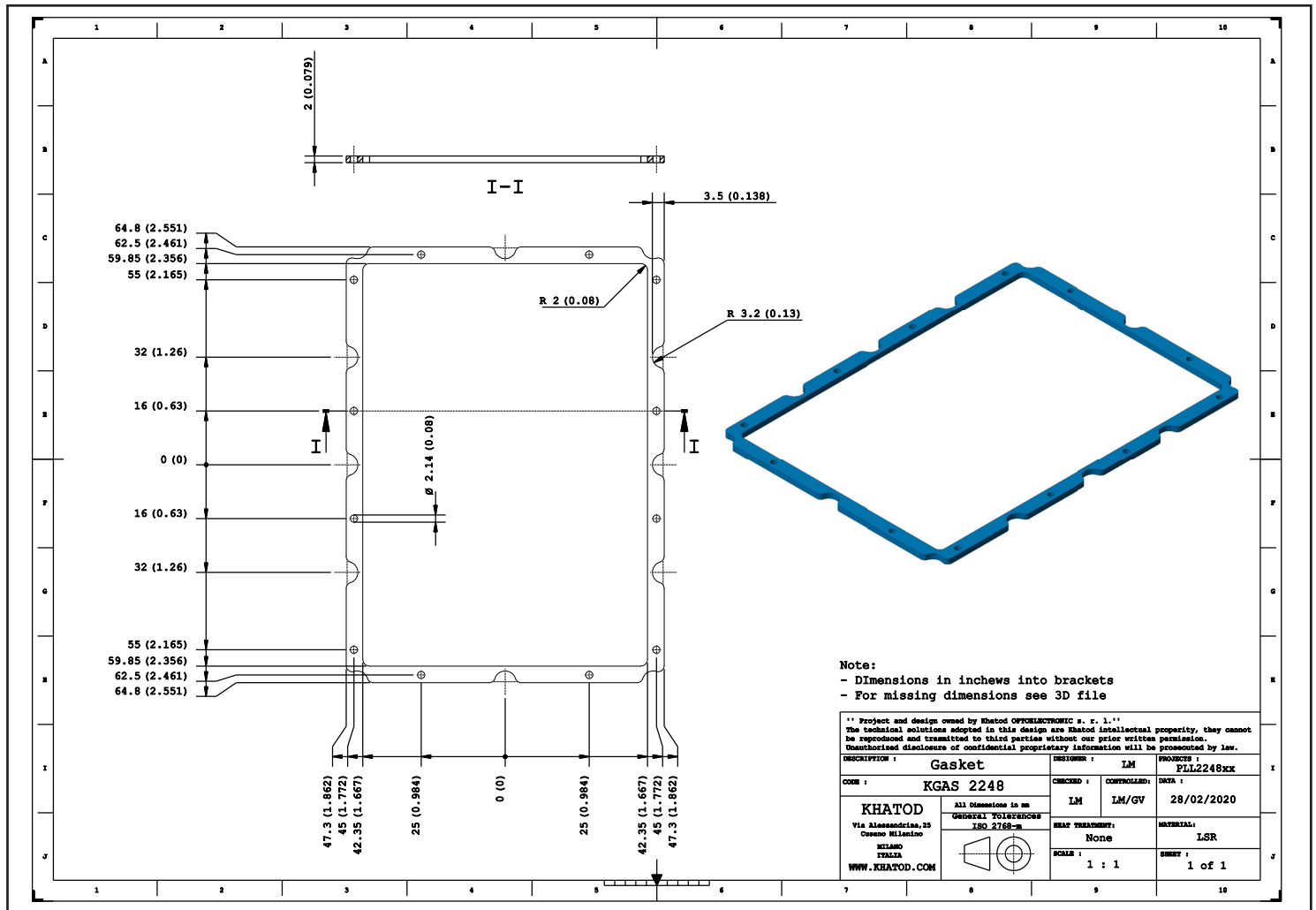
PLL2248AS180 - 180° rotated - Asymmetric Beam - Type II Medium Cut Off



- Material = PC
- Full angle at 50% from maximum: $\sim 90^\circ \times 145^\circ$
- Full angle at 10% from maximum: $\sim 115^\circ \times 160^\circ$
- The light spots here represented refer to tests carried out with 24 LEDs 5.0x5.0mm, and ~ 14760 Lumen



KGAS2248 - Gasket for PLL2248xx, made of silicone



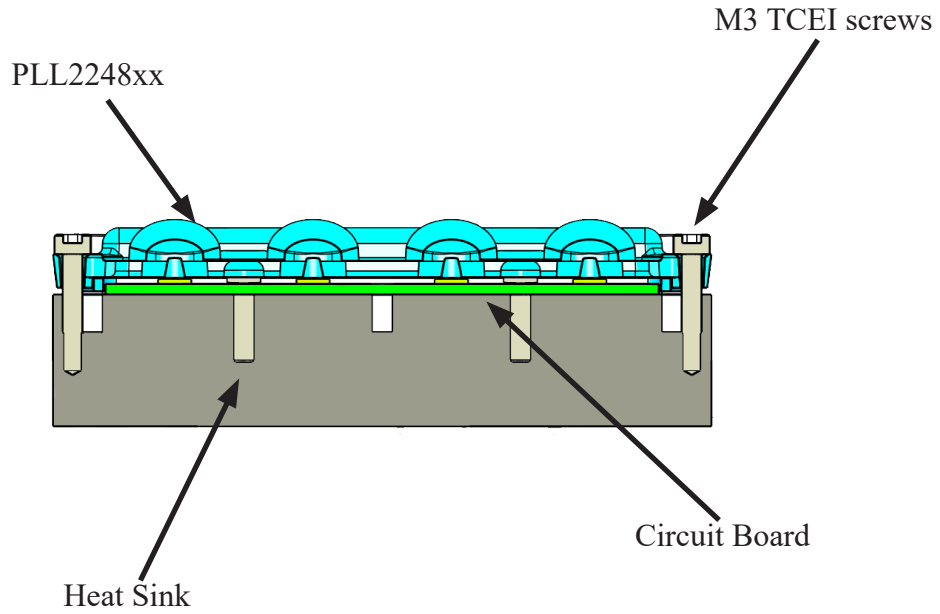
KGAS2248 - Physical Characteristics

Hardness sh A : 65 +/-5	Color : Transparent	Abbrev. : SIL 65H TRASP
Basic Element : VMQ	Vulcanization: 10min @ 150°C	Annealing : 4 hours@200°C

Original Parameters	Unit of Measurement	Detected Values	Test Method
Hardness	Shore A	65	ASTM D 2240
Hardness	IRHD		
100% Modulus	MPa		ASTM D 412
100% Modulus	N/mm ²		

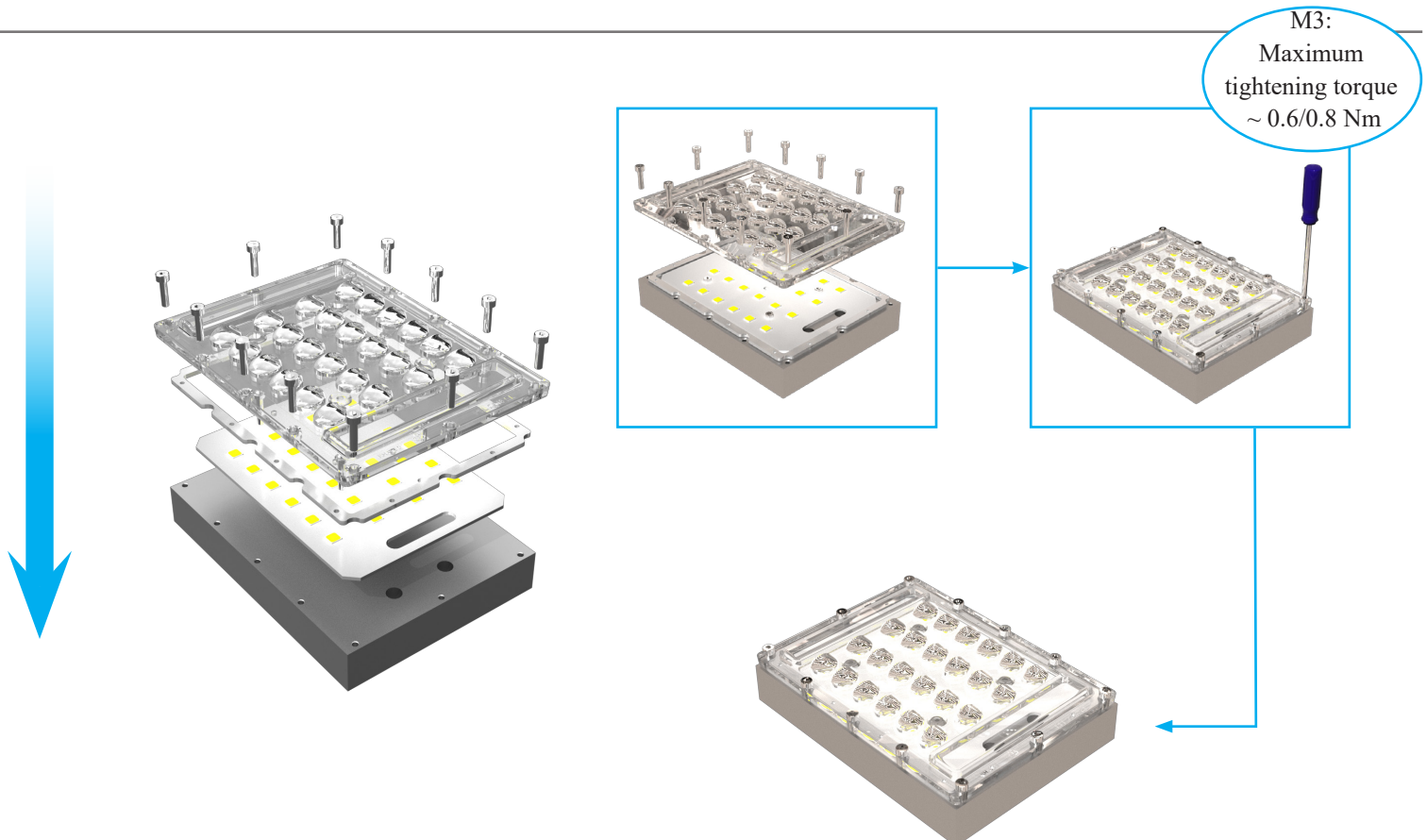
Tensile Strength	MPa	9	ASTM D 412
Elongation	%	620	ASTM D 412
Tear resistance	N/mm	30	ASTM D 624/B
Specific Gravity	g/cm ³	1.16	ASTM D 297
Brittleness Point	°C		
TR-TEST TR10	°C		ASTM D 1329
TR TEST TR-30	°C		
Compression Set 25% Temperature: 175°C @ 22h	%	27	ASTM D 395/B

Assembly Specifications



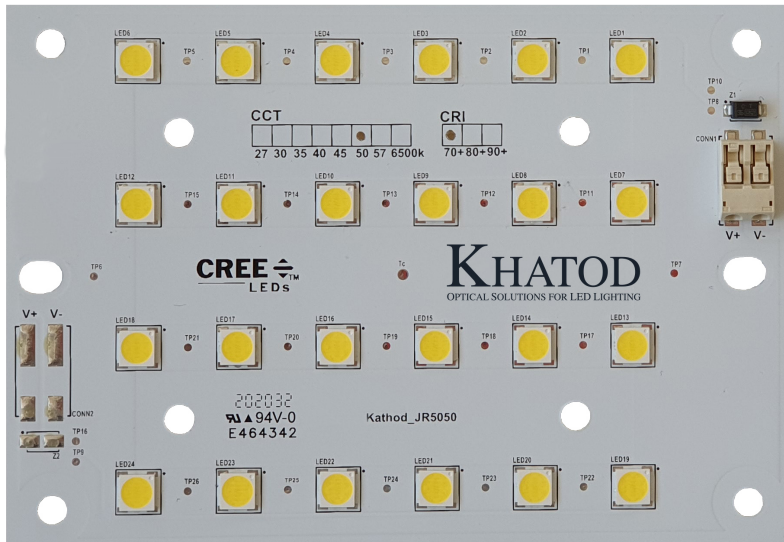
Use M3 TCEI screws

- M3: Maximum tightening torque ~ 0.6/0.8 Nm



PCB for Test - KFP50

Khatod supplies KFP50 PCBs to facilitate customers test.
Circuit diagrams and photos are shown below.



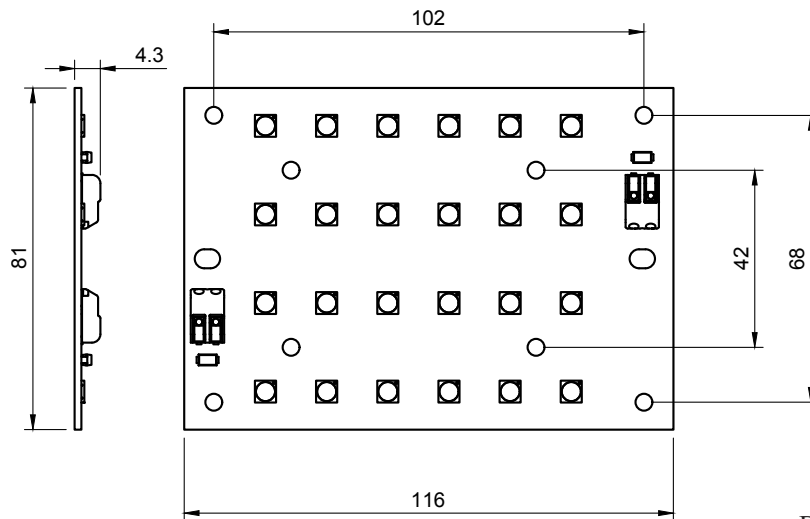
KFP50

36V @ 1600mA

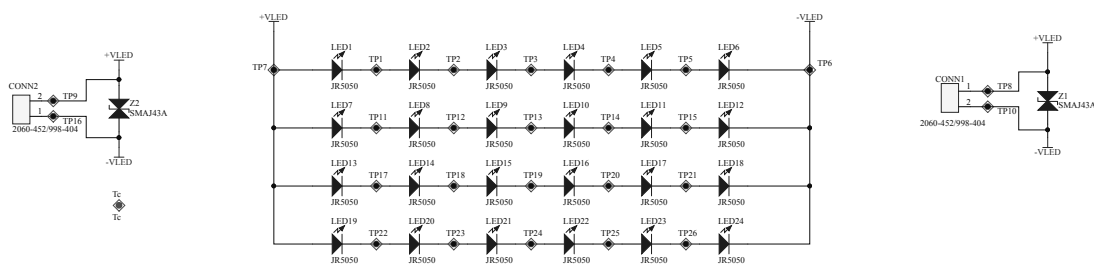
- CCT: 5000K
- CRI: 70
- Nominal Flux: 10.500 lumen
- Power: 55W

36V @ 3600mA

- CCT: 5000K
- CRI: 70
- Maximum Flux: 20.386 Lumen
- Power: 135W



Dimensions in mm



IK Test - Determination of Mechanical Impact Resistance Degree

Note

The present document is an internal document showing the tests carried out by Khatod in its laboratory. The tests, photos and videos presented in this document are made available for demonstration purposes only. Khatod, with its laboratory, is not a certification body. If customers need IK accredited certifications, they have to apply to the appointed Certification Bodies, under their sole care and responsibility.

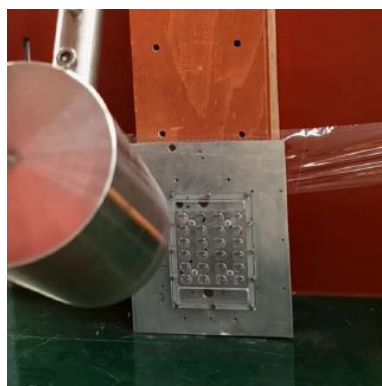
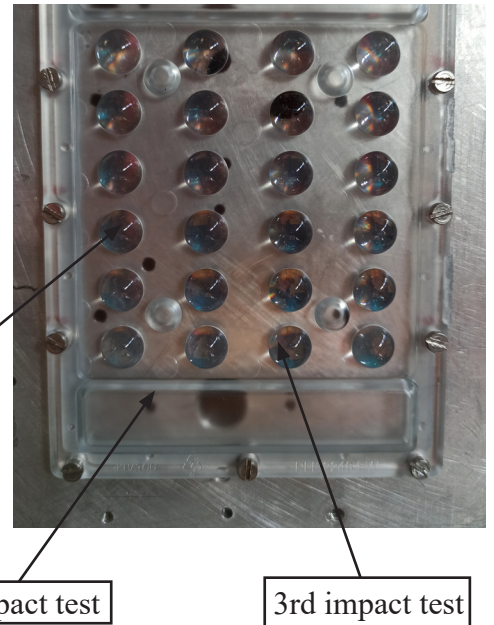
Initial Visual Inspection

- Before starting with testing, a visual inspection was performed in order to check the integrity of the part under test. The part resulted physically intact.

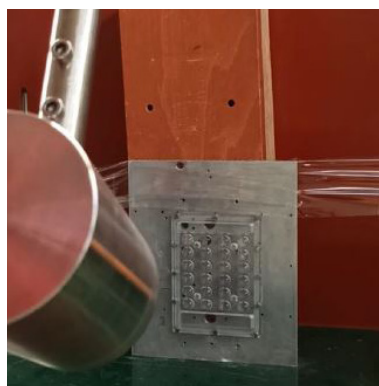
Tests Execution

Tests were carried out on the part under test according to IK10 (20 Joule)
Test parameters are as follows:

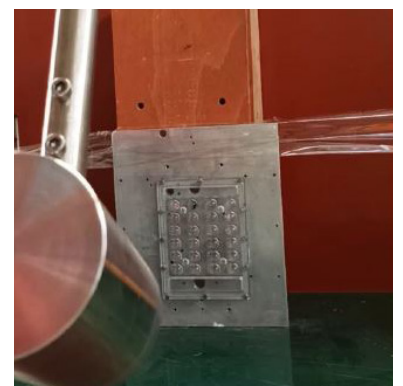
- Impact energy: 20 Joule
- Impacting element: 5.000 grams
- Distance between impacting element and the part under test: 40 cm
- Number of impacts: 5



1st TEST



2nd TEST



3rd TEST



Final Visual Inspection:
After testing, a final visual inspection was performed.
The result was positive. (view photo)

IP X5 Test

Note

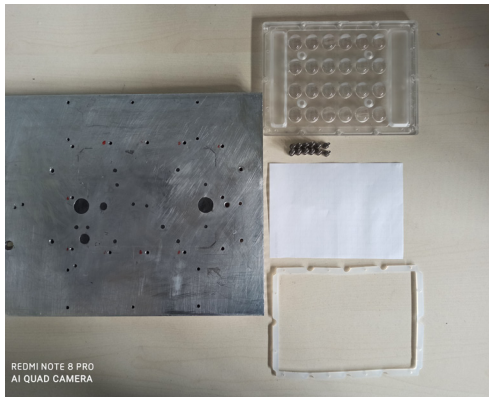
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Data and Analysis

The sample has been subjected to the water-penetration resistance test as follows:

- Assembly of the components to test :
A moisture indicator paper sheet has been interposed between the lens and the clamping base
- Positioning of the assembled sample under the watering device with nozzle \varnothing 6.3 millimeters
- Water flow: 12.5 l/min \pm 5%
- Water pressure: 30 kPa @ distance of 3m
- Duration of water spraying test on the wrap surface per m^2 : 1 min
- Minimum duration of the test: 3 min
- Distance between the nozzle and the wrap surface: 2.5 Meters



PLL2248xx Assembled

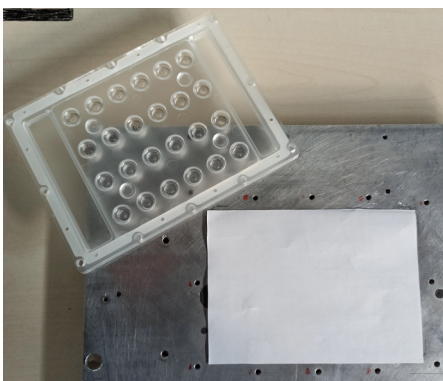


Test Under Water Jet



Test Under Water Jet

Conclusion



As shown in the photo, the test paper sheet is completely dry after disassembling the system.

Based on the water penetration resistance test, polyurethane gasket proved to be fit for purpose.

The product has passed the Khatod test.

The test paper sheet is dry

Thermal shock resistance level



Initial Visual Inspection

Before starting with testing, a visual inspection was performed in order to check the integrity of the part under test.

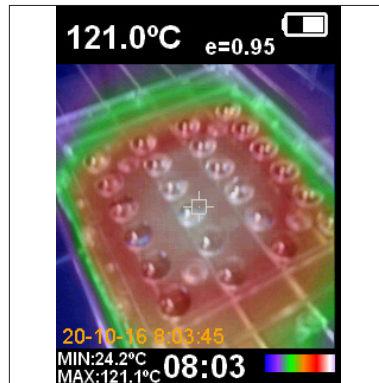
The part resulted physically intact.

The reference temperature of the component under test is 120° C.

Photo: the part in the climatic chamber.



Temperature set in the climatic chamber



Temperature detected on the part by IR thermal camera



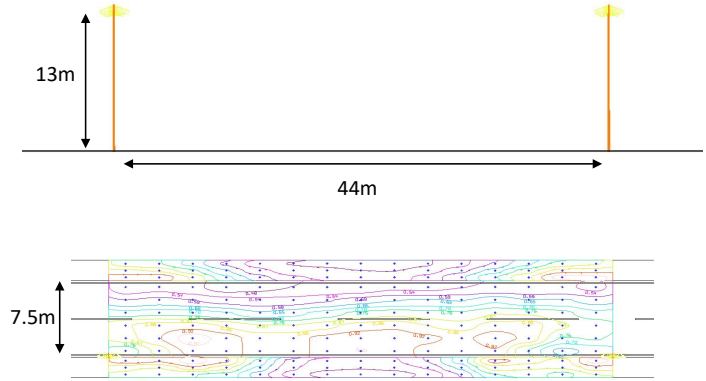
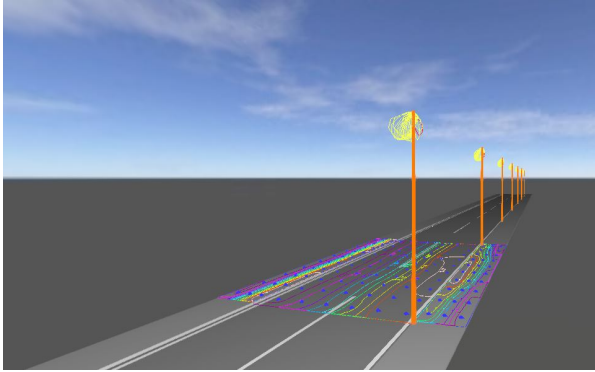
Final Visual Inspection

After testing, a final visual inspection was performed. The result was positive. (view photo)

Photo: the part in the climatic chamber after testing.

Based on the testing result, PLL2248xx test specimens proved to overcome the thermal stress test up to 120°C, without any physical deterioration of the material.

PLL2248AS - PLL2248AS180 - Street Lighting Examples with Dialux

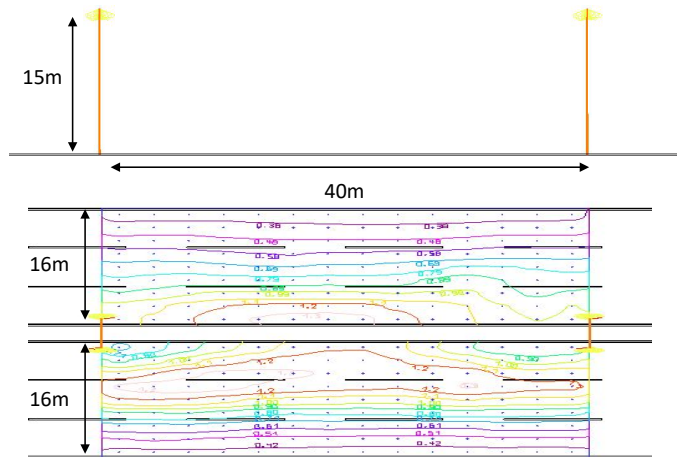
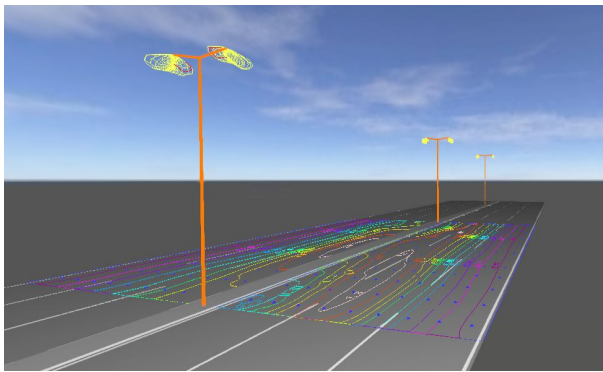


Street Type

Pole to pole distance: 44m
 Pole height: 13m
 Light overhang: 0
 Boom angle: 0
 Road width: 7.5m

Results

Illuminance Class: Iesna M4 LED: Osram Duris S8 Luminous flux: 12500lm	Lm: 0.75 ✓ Uo: 0.61 ✓ UI: 0.75 ✓ Ti: 9 ✓
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Street Type

Pole to pole distance: 40m
 Pole height: 15m
 Light overhang: 1m
 Boom angle: 10°
 Road width: 16m

Results

Illuminance Class: Iesna M4 LED: Osram Duris S8 Luminous flux: 16000lm	Lm: 0.75 ✓ Uo: 0.41 ✓ UI: 0.79 ✓ Ti: 10 ✓
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Application Examples

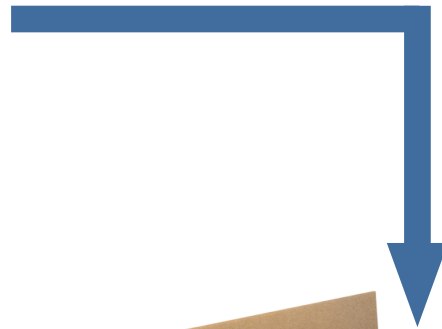


Packaging

Item	Quantity	Total Parts	Size (L*W*H)	G.W.
Multi-pocket plastic bag	10 pieces per multi-pocket plastic bag	10 pcs	110*40 cm	0.68 Kg
Outer Box	30 multi-pocket plastic bags per Outer Box	300 pcs	50*32*39 cm	21.3 Kg



300 Lenses / Multi-pocket plastic bags



30 Multi-pocket plastic bags per Outer Box

Materials

Material	Top
PC	-40°...120°C
PLL2248xx Temperature resistance: long-term	-40°...115°C
PLL2248xx Temperature resistance: short exposure	up to + 120 °C

Notes:

- The optical values shown are the result of optical simulations carried out with LIGHTTOOLS, ASAP and ZEMAX software systems. The optical simulations are carried out on the basis of the typical values provided in the LED manufacturers' official datasheets. The photometric analysis has been carried out on physical samples.

Use and Maintenance

- DO NOT HANDLE OR INSTALL LENSES WITHOUT WEARING GLOVES, SKIN OILS MAY DAMAGE LENS OR LIGHT TRANSMISSION;
- CLEAN LENSES WITH MILD SOAP AND WATER AND A SOFT CLOTH;
- DO NOT USE ANY COMMERCIAL CLEANING SOLVENTS ON LENSES.

Disclaimer

Please note that flow lines and weld lines on the external surfaces of the lenses are acceptable if the optical performance of the lens is within the specifications.

Should you require further information, please contact Khatod for advice. All lens testing must be subject to identical conditions as Khatod test condition. Khatod Optoelectronic, Milan, Italy, manufactures lenses for LEDs. Any other use of the lens shall void our liability and warranty. The lenses are an inert component to be used in the manufacture of various products. Our warranty and liability are limited only to the manufacture of the lens. You may not modify, copy, distribute reproduce, license or alter the lens and related materials of Khatod. Khatod does not warrant against damages or defects arising out of the use or misuse of the products; against defects or damage arising from improper installation, or against defects in the product or in its components. No warranty of any kind, expressed or implied, is made regarding the safety of the products. The entire risk as to the quality or performance of the product is with the buyer. In no event shall Khatod be liable for any direct, indirect, punitive, incidental, special, consequential damages, or any damages whatsoever arising out of or connected with the use or misuse of the product. Khatod shall not have any obligation with respect to the product or any part thereof, whether based on contract, tort, strict liability or otherwise. Buyer assumes all risks and liability from use of the product. The laws of Milan, Italy govern this product warranty and liability and you hereby consent to the exclusive jurisdiction and venue of courts in Milan, Italy in all disputes arising out of or relating to the use of this product. Production, marketing, distribution, sale of these products as well as their possible modifications and variations are only exclusive right of Khatod Optoelectronic. No company can perform any of these actions without written permission released by Khatod Optoelectronic. The information contained in this document is proprietary of Khatod Optoelectronic and may change without notice.

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